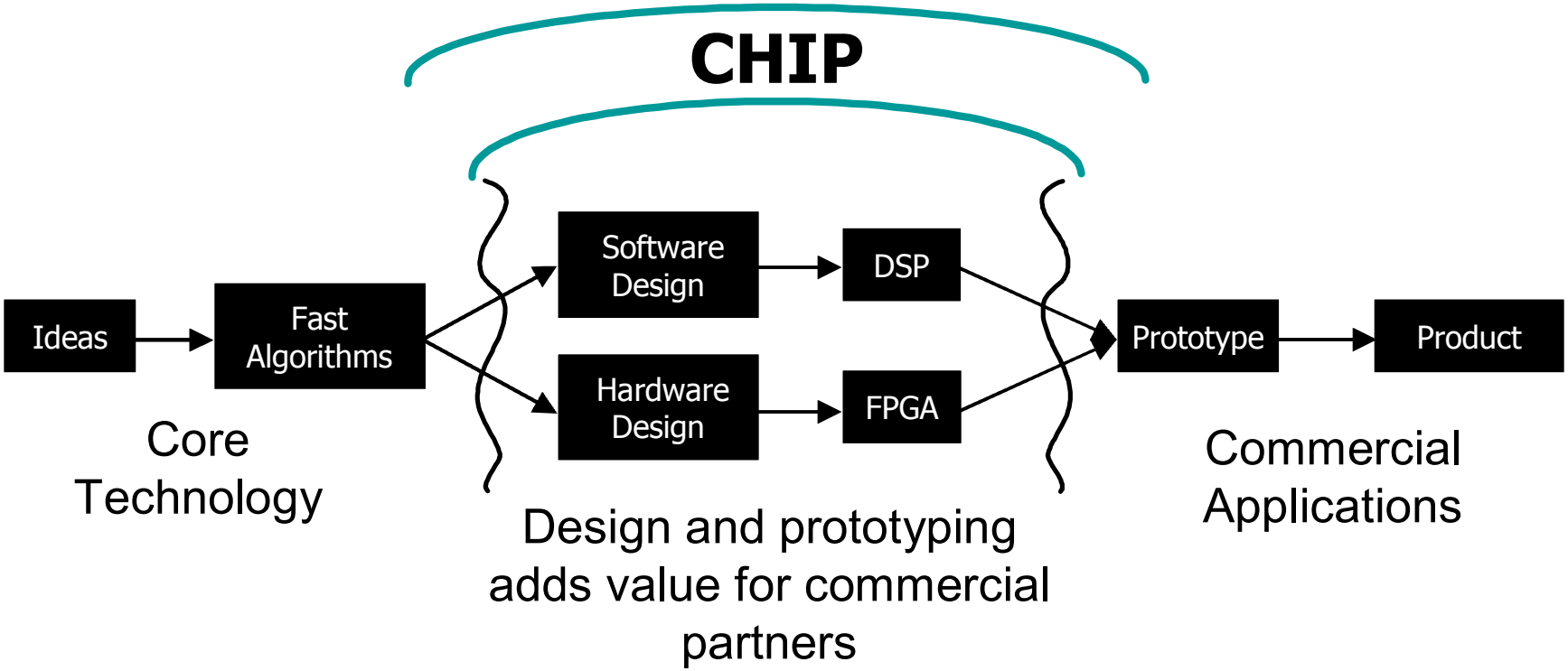
CHIP

(Center for High-speed Information Processing)

Department of Electrical & Computer Engineering

Utah State University



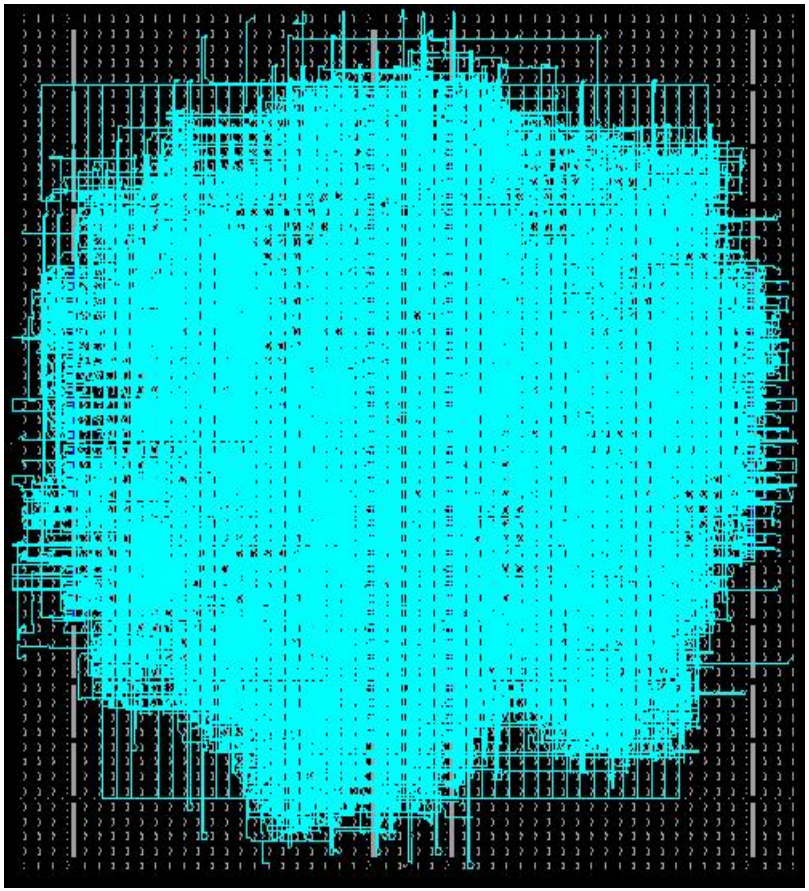
- CHIP locally commercializes fast signal processing algorithms
- Companies need proof-of-function before licensing

CHIP Algorithms

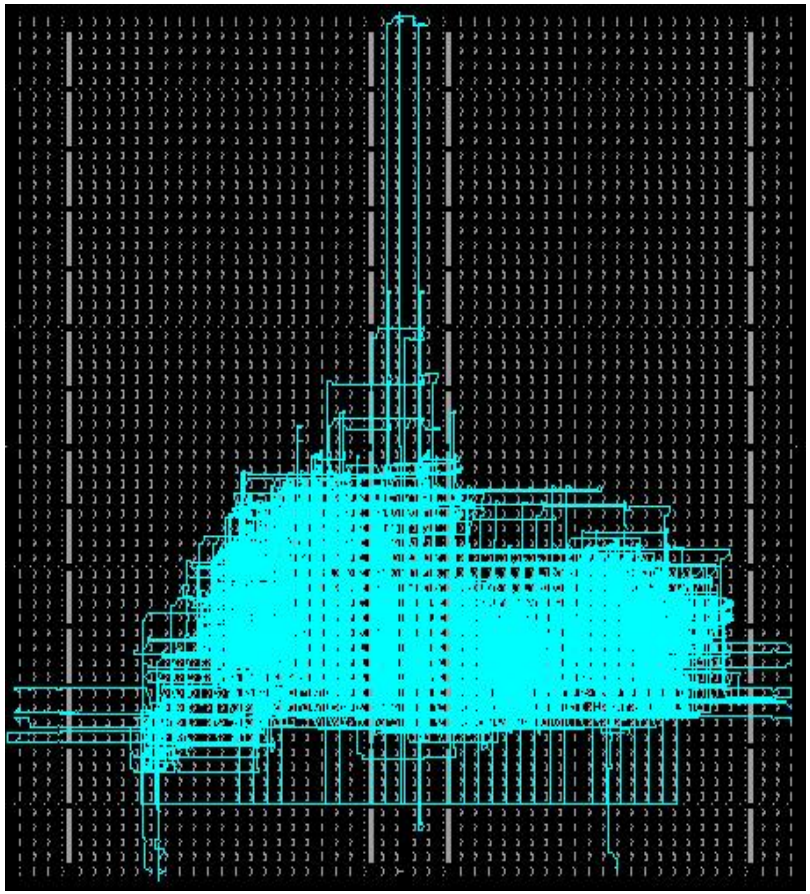
Offers customers a combination of …

- Smaller IC
- Faster
- Lower power
- Less complex IC
- Novel functions

Example Multiplierless Filter



Multipliers: 204,881 gates



Multiplierless: 19,075 gates

¼ the chip area	Smaller chips and/or more fcns
½ the power	Longer battery life
4/5 the time	Faster devices

Center Status

- In 3rd year of operation
- Full pipeline
  - Matured and locally commercialized several algorithms
  - Developed others now ready for transfer
  - Others are in the early and middle stages now
- Commercialization successes
  - One license deal with Utah company (industry leader)
  - One start-up company formed (speaker phones)
- 3 patent applications filed, more in works
- Now focusing on commercializing acoustic algorithms


Blind Source Separation

Acoustic Echo Cancellation

- AEC can cancel echoes during “double-talk”
- New start-up company formed in 2004
- Licensed AEC for desktop speaker phones
- SOHO market size: $500M
- 30-40 new jobs in Utah within 5 years
- $50 Mil revenue within 5 years

Additional Markets for AEC

- We expect to commercialize AEC in additional fields:
  - Performance audio
  - Tele/video-conferencing
  - Speech/voice recognition
  - Hands-free devices (cell phones, hands-free kits)
  - Telematics
  - Voice over IP ($300M and growing fast)

- AEC also adaptable to:
  - Line/network echo
  - Feedback cancellation

Start-up Co for AEC

- Good business for Utah AEC NewCo?
  - Difficult to market AEC's on an exclusive basis
  - For effective nonexclusive marketing, we need:
    - Custom development
    - Product support
    - Marketing machine
    - Company infrastructure
- Example: Amphion
  - University spin-off company (Queens Univ., Belfast)
  - Specializing in video compression algorithms
  - Acquired by Conexant in 2004 for $20M

Year 4 Goals

- Continue AEC commercialization
  - Improve WWW marketing
  - Complete AEC market research
  - Build additional demonstrative prototypes
  - Close 3-4 new license deals with Utah co's
  - Additional $500K - $1M for USU still on the table

Year 4 Goals (Continued)

- Pursue Utah AEC start-up company
  - Define unmet market needs of customers
  - Define business model
  - Look for Utah partner in this space, or
  - Seek to recruit entrepreneurial team

- Help wanted

Financial Summary

- $150K budget request for 2005-2006 (Year 4)
  - Prototype fabrication
  - Engineering labor (students, faculty, staff)
  - Student marketing assistant(s)
  - Web site and marketing materials

	Year 1	Year 2	Year 3	Year 4
Cash	**438,000**	**486,000**	**528,000**	**715,000**
In-kind	**75,000**	**75,000**	**150,000**	**50,000**
Total Match	**513,000**	**561,000**	**678,000**	**765,000**
COEP Funding	**115,000**	**135,000**	**150,000**	**150,000**
COEP Ratio	**4.5 to 1**	**4.2 to 1**	**4.5 to 1**	**5.1 to 1**

CHIP Contact Info

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